UNITS: λ_D and ω_p

Debye length $\lambda_D = \left(\frac{k_B T_e \varepsilon_0}{q^2 n_e}\right)^{1/2}$; Plasma Frequency $\omega_p = \left(\frac{q^2 n_e}{m_e \varepsilon_0}\right)^{1/2}$

where k_B = Boltzmann's Constant $1.36\times10^{-23}\ \frac{J}{^\circ K}$
T_e = Electron temperature (eV)
ε_0 = Permittivity of free space = $8.854\times10^{-14}\ F\text{-}cm^{-1}$
q = elementary charge 1.6×10^{-19} Coulombs
n_e = electron density (cm^{-3})

Note: $F(\text{Farad}) = \frac{C^2}{\text{Joule}}$

$$\lambda_D = \left[\frac{1.36\times10^{-23}\frac{J}{K}\times T_{eV}\times 11594.2\frac{^\circ K}{eV}\times 8.85\times10^{-14}\frac{C^2}{J\text{-}cm}}{(1.6\times10^{-19})^2 C^2 \times n_e\left(\frac{1}{cm^3}\right)}\right]^{1/2}$$

$$= \left[5.45\times10^5 \frac{T_e}{n_e}\ cm^2\right]^{1/2} = 738.3\left[\frac{T_e(eV)}{n_e\left(\frac{1}{cm^3}\right)}\right]^{-1/2} cm$$

$$\omega_p = \left[\frac{(1.6\times10^{-19})^2 C^2 \times n_e\left(\frac{1}{cm^3}\right)\ J\text{-}cm\times10^7\frac{erg}{J}\times cm^2\text{-}g}{0.911\times10^{-27} g\times 8.85\times10^{-14} C^2\ \overline{s^2\text{-}erg}}\right]^{1/2}$$

$$= \left[3.175\times10^9 \frac{n_e\left(\frac{1}{cm^3}\right)}{s^2}\right]^{1/2}$$

$$= 5.635\times10^4\left[n_e\left(\frac{1}{cm^3}\right)\right]^{1/2}\ \frac{\text{Radians}}{s}$$